

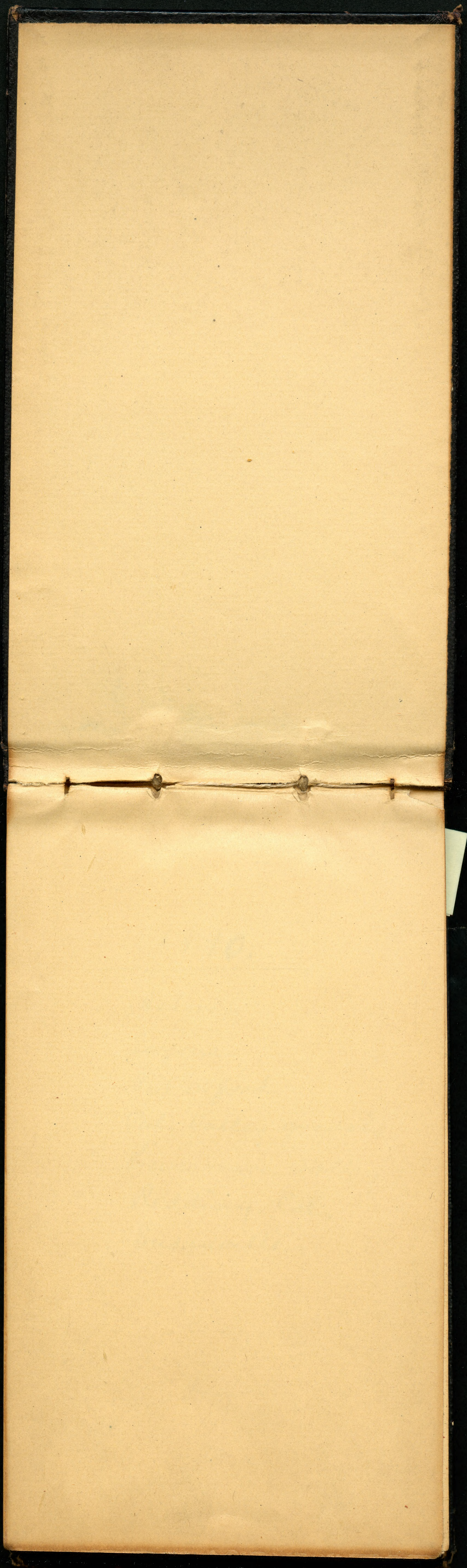
U.S.

Dall

1890.-1

Astoria, Eugene, Ore.
Cal. gravels, Valley
of Cal. Livermore.

SURVEY.



10.

1890.

Astoria

Eugene

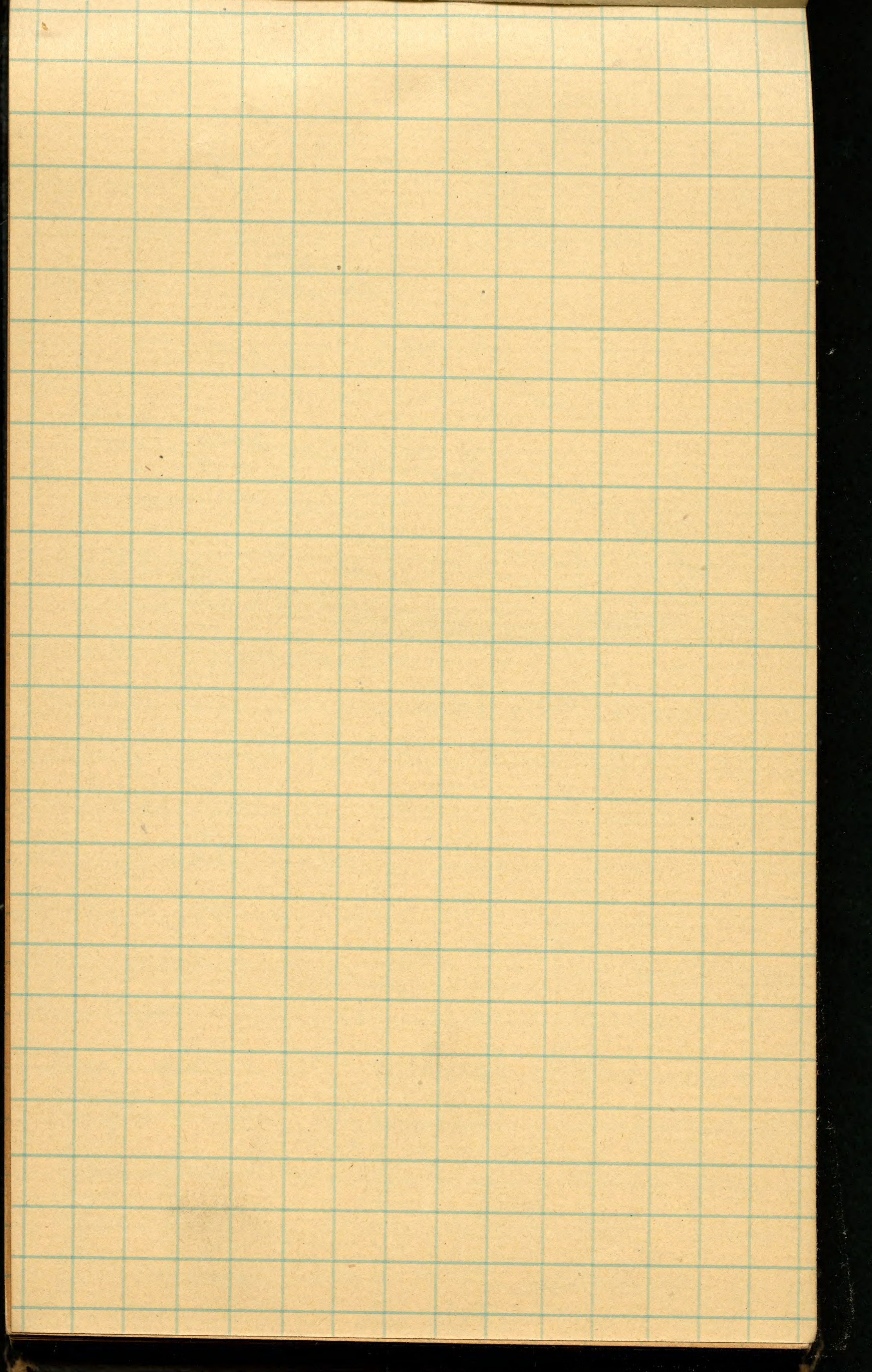
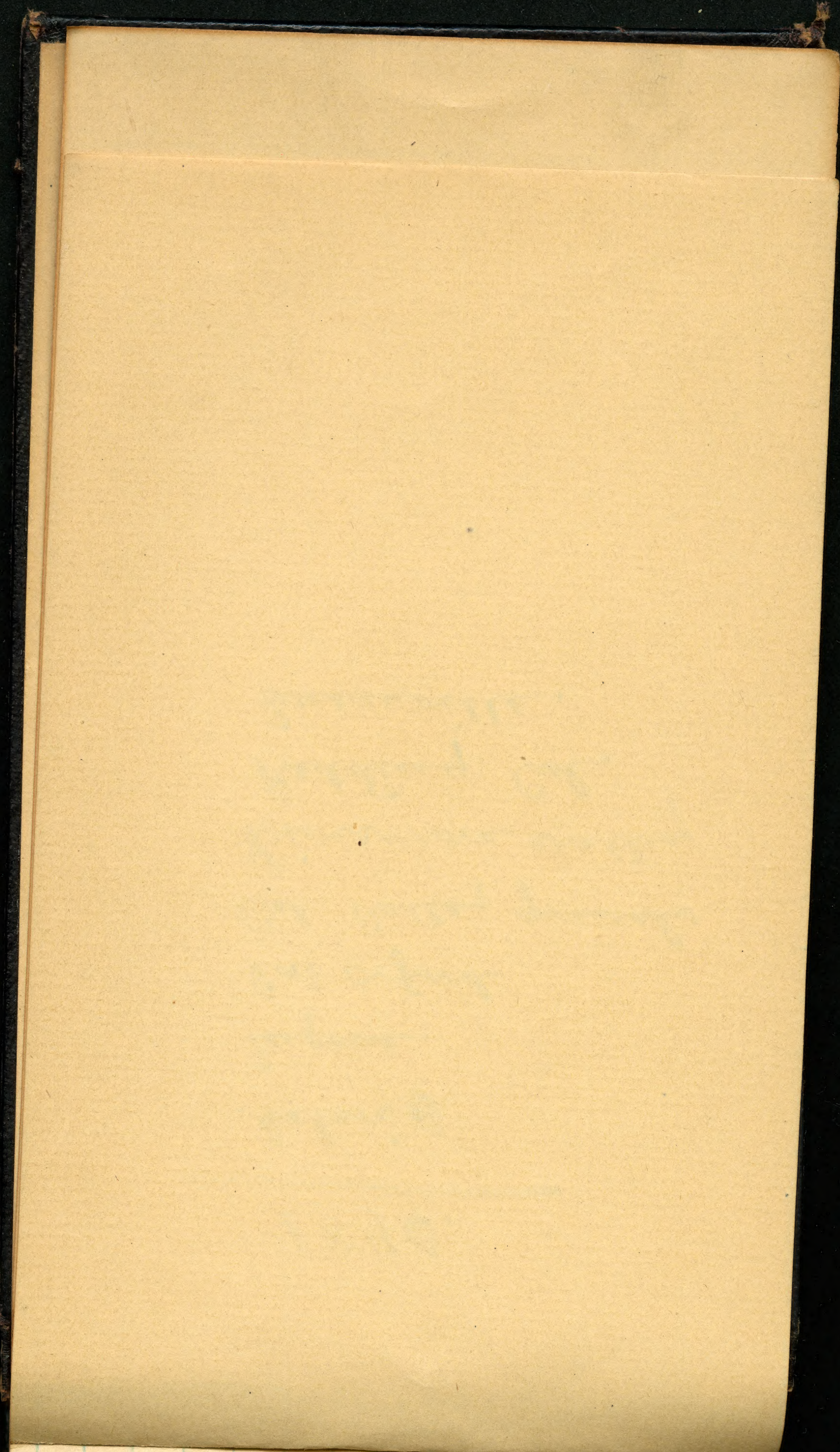
Pat Orford

Cal. Valley gravels

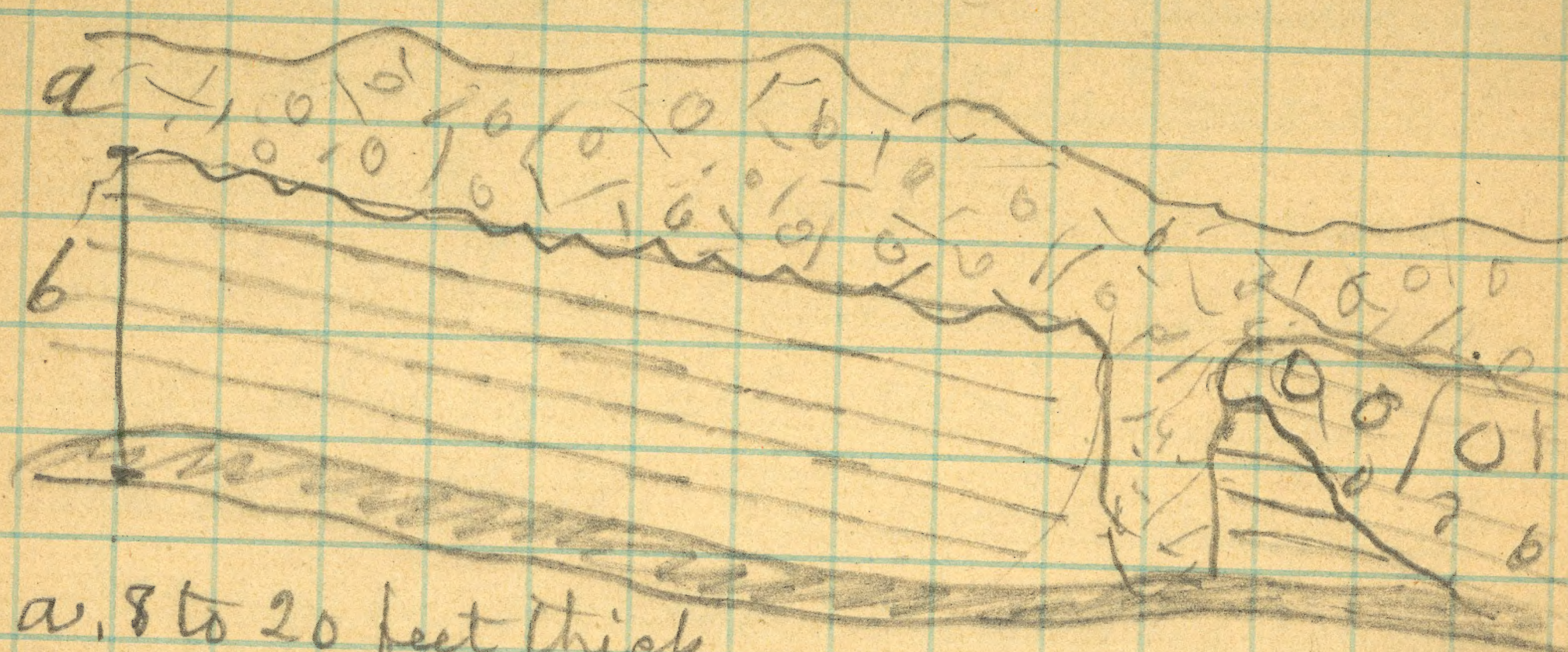
Livermore valley

Redding, Cal.

Susanoille.



Smiths Point, Young's Bay.
Astoria west of town, east of
the high hills on N side of the
Columbia bears N. 50° W. The
N head at entrance Columbia River
bears N. 78° W.



a. 8 to 20 feet thick
Yellowish clayey sand with irregular
mostly rounded stones maculated with
peroxide of iron, mostly sand some few
clayey with traces of marine fossils, also
more or less gravel; not regularly bedded
and penetrating into the layer below
To dips about 16° S and about the
same strike to SE by S. Exposure abt.
15 ft. vertical at highest. Composed of
regular thin layers of chiefly a
bluish gray clay with numerous
fractures lined with peroxide of
iron which develop more now.

merously as the surface dries. The layers contain little sand, some do not show any, but the differences are apparent by the weathering and appear in their sequence to follow with a certain regularity. Here and there a little gravel is mixed in one of the layers and in these gravelly layers are also small fragments of bivalve shells, the most perfect being a small slightly concentrically undulated *Pseudamnisium* less than half an inch long usually. *Acila* was also observed and a small *Waldheimia* like the young of *Lagurus californicus*. Occasionally in the upper layers of this formation the clayey parts have formed concretionary nodules in part fossiliferous. They are arranged in thin layers of a single series of nodules. These contain foraminifera and I saw a fine *Solaricella* of small size in one fragment.

also carbonaceous particles
and fragments of small bi-
valves chiefly *macoma*.

This disappears under the small
talus at the foot of the section. The
beach of the river not far distant
is composed of the pebbles and small
boulders of the hard sandstone
from upper layer (a). There are
also in this layer rare rounded
small pebbles of a very hard
bright pink ^{minutely} granular rocks whether
crystalline or sandy schist I did
not determine.

~~Near~~ ~~For~~gue Pt the same formation was
recognized, but layer (a) seemed thick
and the regularity of the layer (b) was
much broken up. As far as could
be determined in the absence of any
road or path at the foot of the bluff,
which is fenced off into lots most of
which are built upon, the formation
is the same all along the bluff be-
hind the town which is largely built
upon piles. The High or Public ~~School~~
building is at about the western third.

of the front and on each side of this the hills rise higher than elsewhere, perhaps 150-200 feet in all. Behind the slopes which have been graded and built upon, there is on the west part of the bluff facing northwardly, a fine section with thirty or forty feet of the ^{gray} clayey layers (I) exposed at an angle of 45° - 60° , surmounted by as much more of the yellowish alluvial (a) which here and there descends, in dykes, into the clays. The clays dip about 26° SSE, but are not invariable and in some places are broken down or show signs of having crept. The alluvial (b) has crept over the clays on many slopes and where cleared away leaves fine examples of slickensides. On Chenamus St. a gradual slipping of a bank of this kind has pushed the plank sidewalk at its base nearly two feet out.

of line. The upper margin
of the clays is not always well
marked in the sections being
sometimes ~~not~~ indistinguish-
ably merged with the alluvial,
and similarly colored with
iron derived from the alluvial

The fossils are beside the *Purpura*
~~or fusus~~ a variety of bivalves, *Macoma*
Acila, a grooved *Yoldia* like
lancoolata, a smooth one like
amygdala, a truncate one like
obesa (?). A large *Pecten* ^(*cerrosensis*?) with
stronger ribs than *caurinus*.
a *mesalia* or *Turritella*, slender with
elevated spirals, two inches or less long.
a large coarsely grooved *Denta-*
lium (like *Albatross* sp. but less curved
& more cylindrical) a small *Natica*, a
Cytherea, an *Axiinus*, a large *Lima*

From Shoalwater Bay Mr. White showed
me siliceous casts of the *Purpura*, the
Dentalium, the *Mesalia*, the *Cytherea*, a
Macoma and *Aturia zigzag*, which
would suggest a very late Eocene or
Early Miocene age for these clays.

It should be noted that in the upper part of the clays the fossils or at least part of the bivalves seem to have been fossilized in a sandstone, washed out and reembedded in the clays, so that between the valves, or on one side of a single one, there will be a ^{soft} coarse sandstone while the fossil is otherwise entirely embedded in a dark waxy clay.

Longue Pt. itself is a basaltic mass and on top of the ridge behind the town according to Prof. Condon there is a layer or strip of basalt, fragments of which are found on the beaches. About one block west and on the south side of the street from the Union Pacific dock where a fire had burned away the planking of the sidewalk and buildings there is a very large solid block ten or twelve feet square and fifteen feet high probably of basalt though I could not

get at it to test with the hammer.

The original beach at its foot was abundantly strewn with large fragments of the same stone.

I looked carefully along so much of the beach as is at present exposed for concretions but found none though formerly there were a good many of them. They were burned for lime in early days, lime being scarce in this region and the bed from which they were derived being very low down & near the water's edge has long been covered by plank roads piling and buildings, so that little erosion has been likely to take place of late years and the supply is probably permanent but cut off.

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Astoria zigzag (or *Matthewsoni* Yabb) was found in concretions of the shale washed out on beach at Astoria by Prof. Condon and also at Tillamook (+ Shoalwater Bay, White) heard of it at Bellingham Bay but did not see specimens.

Eocene on Duwamish River 12 m from Seattle, *Turritella*, small *Cytherea* etc.

- *Rostellites*? Eocene of Astoria / concretion
Miocene Cape Arago & Yaquina Bay.

Pt Arago is Eocene & Rocky Pt 5 m inland on Coos Bay
~~is the~~ is Miocene

Big *Scaluria* from near Springfield bridge a few miles from Eugene
Also from Salem Oregon

Sirocoma-like shell Cape Arago
Eocene other from Eugene Miocene

Rostellites from Astoria^(Eo?) (118) Coos Bay
& Yaquina Miocene (all?)

North Umpqua River Forks
Melanopsis like shell, 20 miles
east of Roseburg near Patterson's
Mills Oregon

Pompholyx effusa typical from
the river between the lakes Klamath
Carinifex recent one from the
same place called Link River
Carinifex fossil from Silver L.
Lake Co. Oregon.
Planorbis from Link River

Quaternary from Lighthouse at
Cape Blanco Ore. 210 ft above
the sea; also at Cape Arago, Tillamook and Chualar Bay where
they are only 50 feet above the sea
Prof. Condon. Shells as follows see
lists further on in book

Smith's quarry, East about 1 mile
from Eugene. In Miocene
rocks with *Mytilus Modiola*, *Mac-*
tha, *Solen*, *Natica*, *Neverita* *Purpura* &
Liofus. Rock grayish sand from
soft to quite hard, weathering yellow-
ish dipping SE by about 6° covered
by alluvial, upper layers broken
up, lower ones more massive
with several lines of specially
fossiliferous rock crammed
with crushed fossils mostly
molds but some retaining their
lime which has however been re-
crystallized into spar. Thickness
of rocks exposed about 37 feet
but not more than 20 ft in any
one vertical (are visible)

Springfield bridge. Three miles E from Eugene. E. side of river beginning just south of new abutment. Strata dip eastward between 5° and 8° the section being a little east of S and W. of N. along the river (Big Scleria found near this spot) for about a mile; measured thickness of the rocks from the abutment of the new bridge (1890) to the point where they dip below the river and form a bar at low water about 160 feet.

This is an excellent section of the Miocene which is here unconformably overlaid by 5-10 feet river alluvial, the largest gravel just over the edges of the Miocene rocks. Top of hills capped by basalt according to Prof. Condon. The surface under laid by Miocene is gently rolling and has been //

eroded before the deposition
of the gravels. The Miocene
rocks appear all around
the edges of Chathamet valley
except where they dip into
deep valleys & are obscured
by alluvial or where they are
covered by basalt. They
over lie the Eocene at Coos
Bay, where they form the
landward slope the sea
ward slope being formed by
the edges of the Eocene.
The last Schists occur at
the islets at the mouth of
the Coquille River above
this Eocene forms the
coast to

where it is succeeded by
the Miocene which persists
to

Up to Port Orford the coast is composed of schists & the last serpentine hill is at Port Orford. Between Orford & Blanco and at the foot of the latter is a small strip of Miocene. Six or seven miles north at village of Denmark is a stone quarry based on metamorphic rock above which are 4-500 feet of what Prof. C. takes to be Eocene rock but which bears no fossils, a sandstone somewhat altered in the central part of the Λ fold. Then a low coast to the mouth of the Coquille but inland where the land rises to 500 feet or so, *Cardita planicosta* has been found. off the S. head of the Coquille are several schistose islets with feldspathic and hornblende crystals. In the sheltered nooks between these is found quaternary about 80 ft above the sea. B

North of the Coquille the shore is sandy until Cape Arago is reached - This is Eocene. Going inland at Rocky Pt. about six⁴ miles in, the Miocene begins.

Across the entrance there are 20 miles of sand until the mouth of the Umpqua is reached.

Here is another large mass of rocks referred by Prof. C to the Eocene and supposed to be continuous with the known Eocene of the upper north fork of the Umpqua 20 miles E of Roseburg.

The Miocene appears on the coast a little south of Yaquina Bay, without any Eocene until Astoria is reached.

Inland at the base of the Coast mts on the Siletz reservation a fine Nautilus of the pompilius type was collected, probably Eocene.

At Astoria the Eocene forms

ly appeared a bed with concretions among which *Atrypa* was collected. These were washed out on the beach & burned for lime years ago & the town has covered the old beach so they are no more accessible. In Shoalwater Bay it appears again. There is a fine exposure of quaternary at Shoalwater Bay about 30-40 feet above sea. At Duwamish 12 miles from Seattle there is Eocene

In the Wahlamet valley from Corvallis to Albany the river is forced to run to the eastward by a fine Eocene mountain mass.

Near Sheridan *Cardita planicosta* has been found. Yamhill County.

Shoalwater Bay Pleistocene

Schizothaerus

Saxidomus squalidus

Macoma squalosa

Alcea luvula *Purpura cris-*

Memæa mitra *pata*

Tapes staminea

Pliocene immediately under
the above has

Buccinum cyaneum

Mytilus with strong divaricate

Crepidula sp. (ribs)

Pecten medium size sharp

ribs rather inflated

Panopæa?

Jaquima Pleistocene

Zirphæa crispata

Placunanomia macrochisma

Pholadidea penita *Natica lewisii*

Saxidomus squalidus

" *aratus* *Macoma* *aratus*

Tapes staminea *Purpura crispa*

10-80 ft
M. Jaquima ~~8 ft~~ above sa
quaternary

Bandon quaternary at the
mouth of the Coquille. (80 ft)
+ 60

Saxidomus squalidus
Schizothaerus
Purpura crispata
Priene oregonensis
Margarita Beecheyana
Mya truncata
Macoma sabulosa
Terebratulina
Saxicava rufo-rosea
Acmaea like small *Cumingii*
* (*Cardium corbis*, Tillamook)
Placunanomia macriscapha
Margarita papilla
Amphissa corrugata
Trichotropis cancellata
* (*Acmæa mitra*, Tillamook)
Ocenebra intafossa

Cape Blanco quaternary
200 ft

Schizothaerus
Saxidomus squalidus
Mya truncata
Lapes staminea
Macoma inconspicua

Warner Lake shell mark.
cemented with silex
Carminefex angulata
rounded large
u or Planorbis very large
angulata at base
Valvata rounded smooth large
Pompholyx ~~thin~~
Aluminiola
Anchylus
Pisidium

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Crooked River E of Cascades
Old Lake Basin near Divisadero
Physa - Lake Warner

Union Co E. Oregon
E. slope of Blue Mts
near Snake River

Large Vivipara
Melanian like Gonolasis
Lithasia?

Near Powder River and the
Old Emigrant Road.

Melania
Vivipara
Lithasia antiqua
Small form like Billium

Redding Cal

The fossiliferous sandstones of Redding seem to be unconformably adjacent to the metamorphic schists of the valley further up. Near Middle Creek the valley which is narrow begins to widen and its floor is formed by the irregular edges of the schists where the floods have laid them bare. Above them is the coarse reddish gravel containing many rather large cobblestones. One third of the way, or so, from the Middle Creek Station to Redding the schists come to an end and there is a series of somewhat complicated strata, the lower of which are sandstones, mostly a good deal tilted, dipping to the S.W. Over these lie (1) a ten or twelve foot stratum of gray sand with enough clay in it to give

the mass stability. This bed is remarkably uniform in texture and free from pebbles or other fragments and showing no trace of fossils. It is on the whole more horizontal than the sandstones and visible over not to exceed half a mile of the section. Over it are the same coarse gravels which cover the schists, but here the gravels seem almost or quite conformable to the sandy bed.

The fossils collected were obtained at the first outcrop of sandstone on the railroad cutting west of the track on the way from Redding to Middleburgh. Very few have any of the ^{form} of the shells preserved; a *Voluta* or allied shell much resembling *V. rugatus* externally rather long (2 in.) and spirally sulcate, showed the most.

Susanville Cal

Mr. Frost found impression
of radiated bivalve perhaps a
Rhynchonella in a small
slate pebble in the gravel of
the head of the valley above
Stanley Brown's camp near Mr
Lor's house.

He also has mass of Tertiary
shell rock with

Acila like *castroensis* or *Lyalli*

area

Trigonia!

Cyrena?

Cytherea

Probably *Chico*.

Actaeon etc

from Mineshow road, Butte Co
20 miles SE of Chico, Cal.

Stockton Cal.,
Jerome Hawes esq

For many years devoted to boring artesian wells in the valley for water, oil, gas etc. and has probably done far more of this work than any other man in the state.

In boring in the valley away from the vicinity of the foothills the strata everywhere show great uniformity. They consist of clays and sands the beds of clay getting relatively thicker as they descend the beds of sand usually 6-8 feet thick remaining unchanged while the clay will sometimes attain more than 100 feet without a break. The layers are perfectly horizontal or at right angles to the axis of the bore. Gravel is rare, at about 200 feet in Stockton there is a layer of which the pebbles reach the size of cobblestones. This

layer at the well in the Courthouse
yard is about 50 feet thick and
also at the Hawes gas well, but
laterally from a line drawn be-
tween these two it diminishes
in thickness and runs out to
a few feet at the distance
of a few blocks from this axis.
From this to about 1400 feet
there are merely alternating
layers of clay and coarse sand.
About 1400 feet (Hawes gas well)
there is more gravel with round
ed pebbles usually rather small
not exceeding $2\frac{1}{2}$ inches in di-
ameter, mostly quartz or clay
porphyry; usually with a thin
black coating of iron oxide but
occasionally without it. The
greatest depth yet bored is about
2100 feet but no rock was yet
encountered at that depth. At
1100 feet the water begins to be some-
what saline, contains magnesium salt,
and some borax beside bubbles of

gas and traces of petroleum.
At 1400 feet there is less salt
(not very perceptible to the taste)
but more barytes and the water
has a temperature of 90° or
thereabouts. Below the gravel
it becomes more saline again.

It is not potable below
1100 feet. 20 miles east from
Stockton at the edge of the foot
hills at about 200 feet struck
a layer of waterworn granite
cobblestones in a volcanic
matrix, after boring through
this over 100 feet, came to
gravel & sand as in the valley
and got no more rock in
that boring which was carried
to over 900 feet.

The gravel is traceable to the Si-
erras. The sand and clay from
the Sierra side is different in
texture and color from that on
the Coast Range side of the
valley. But on the latter side
after boring through about

500 feet of Coast Range detritals the drill comes to Sierran gravel and thereafter continues in it, showing that the latter underlies the Coast Range talus. At the southern end of the valley the flows of water are larger, purer and more powerful than in the northern part and the decrease is so gradual that Mr. Hawes thought that the artesian water of the valley proceeds more from the South than from any other direction.

No fossils are found in the valley borings. Once he found a spiral shell when boring near the foothills. Small twigs and particles of wood are occasionally brought up but no large pieces. The harder nodules of the clay sometimes are perforated with holes like the borings of borer.

animal. These tunnels, rarely larger than the little finger, are sometimes coated with a limy deposit internally.

At about 1000 or 1100 feet a limy or alkaline layer, quite thin, was sometimes passed through. (Specimen) Some pebbles from 1400 feet (Specimens) were evidently waterworn and mostly quartz. The water from this depth has a slightly milky tinge until it gives off its gas when it becomes nearly clear and of a pale greenish tint in mass.

The conclusions from these data are that the valley as an estuary is older than the volcanic conglomerate and than the present elevation of the Coast Range. That deposition first from the Sierras and subsequently also from the Coast Range, has

gone on continuously and without material change of ~~level~~ ^{plane} or tilting of the deposited strata though they may have sunk. That the throwing out of the volcanic conglomerate did not interrupt the general detrital action which may even be said to be going on still. That during this deposition the valley was a fresh water lake or estuary which did not sustain marine life, or at all events was not favorable to its existence, and at the same time afforded no suitable conditions for freshwater shells.

Livermore Valley
Oct 2 - 6/90

The Livermore valley is the largest valley of the Coast Range north of Mt. Hamilton and unlike most of the valleys of this range is well watered, agriculture requiring no irrigation the rainfall about 12 inches.

The entire watershed is discharged through Niles Cañon into San Francisco Bay by the so-called Alameda Creek. Within the valley there are a large number of creeks each draining a smaller valley or cañon of its own.

The south easternmost is the Arroyo del Viaje which discharges by a permanent stream into a small rounded valley from which there is a small narrow passage into the Livermore valley proper. Here the

hills are composed of miocene sandstone and gravelly strata. The lower layers near or in the bed of the creek are composed of river pebbles mixed with worn and broken miocene shells, oysters, Venus, Tapes, and other bivalves with an occasional Gastropod crushed together with many small quartzite pebbles worn smooth. The rock is very hard and the material clearly the compacted result of the beachworn marine fragments and the gravel of streams, the layers a good deal twisted but the stratum composed of them conformable with those above. The dip is entirely variable but on the whole the strata dip eastward from a few to nearly 30 degrees. A mile or two up the cañon

we come upon a mass of much crushed and contorted schists, cut every where by quartz and jasper veins of various sizes. These quartz veins furnish the pebbles found in the later sandstone and clayey layers, together with cobbles composed of the harder parts of the schistose rock. The sandstones lie unconformably against and over the schist, somewhat as at Redding. The lower layers as described are full of worn fragments of shells but none in their natural shape, condition or position. The upper layers vary in composition, but are more largely sandy and with numerous sandy concretions surrounded with thin layers of iron oxide, and here and there vegetable remains but

very few quartzite pebbles and practically destitute of fossils. The layers are of various thickness and succeed one another with something like regularity. The upper layers are frequently pale greenish or whitish when weathered, or a little more blue internally. They weather easily and fragments exposed to the air gradually slack up into loose sand. Here and there are clayey layers or lenticular masses which intercept the infiltrated iron and are often much hardened by it. The uppermost beds as a rule become somewhat more horizontal than those below and above them all, unconformably to their eroded edges is a layer (5-10 ft) of clayey soil full of pebbles of all sizes, up to cobbles, and also

the weathered concretions of the underlying sandstones. The beds of the brooks are full of the gravel and pebbles which were first derived from the schists but which have been utilized more or less in the subsequent strata and may have been washed out from any of them.

The talus at the spur of the hills side often almost wholly composed of this gravel the finer material having been carried away. The flat part of the valley to the south is largely composed of brown earth belonging to the uppermost bed described mixed with vegetable loam. Further north there is in the valley and on many of the foothills a very deep layer of the so-called "black adobe" a black clayey

loam which is very soft and in wet weather forms an almost impassable mire and in dry weather shrinks and cracks in all directions.

The miocene sandstones of which the hills are chiefly made up attain a thickness of several hundred feet without any duplication being counted in.

The Tassajara Creek flows westward from the flanks of Mt. Diablo and with its tributaries about ten or twelve miles northward from Livermore. This creek was followed for eight or nine miles up to its headwaters in the hills. It issues by the junction of two brooks from a narrow cañon on the SW flank of Mt. Diablo. Some of the springs which feed it are impregnated with sulphur and

magnesia and give off fumes of sulphuretted hydrogen.

Just at the entrance the strata are nearly vertical the dip being toward Mt. Diablo and further away from the mountain the spur which bounds the valley to the south is composed of strata which dip toward the mountain at right angles to the axis of the spur from 95° to 45° degrees the dip decreasing distally. At the entrance of the cañon to the north the strata most prominent are of a compacted friable conglomerate of river pebbles with very little fine material containing occasional resistant fossils, such as the heavy shells of *Ostrea*. This material varies in hardness and weathers into fantastic shapes. Further up the cañon on the right hand side

of the road is a section of some of the whitish sandstone fine and nonfossiliferous (specimen). It weathers yellowish white or pale greenish, and appears below in the valley at each side as a well defined stratum, at intervals. After issuing from the cañon, the Tescujana flows through a flat alluvial bottom, of material derived from the adjacent hills deposited in nearly horizontal layers and covered to a considerable depth (5-10 ft) with black adobe. Through this material are sparsely scattered worn fossils, derived from the sandstones, mostly bivalves.

Somewhere about the headwaters of this creek according to Dr. J. G. Cooper, some years ago Yates found some fresh

water mark, the shells, according to Stearns, offering some rather remarkable peculiarities. This Cooper supposed to be Pliocene, and my trip involving some 45 miles of driving was undertaken in the hope of re-discovering this bed, but for want of a more specific location we did not succeed in finding the mark which might have been restricted to a small area.

The Terasajara cuts a very deep channel in the alluvial, being sometimes thirty or more feet below the surface of the alluvial and the banks nearly vertical in many places. Of this bank, ten or more feet may consist of black adobe, though often less and the rest of sandy and gravelly layers, the bed of the creek being sometimes formed by the harder sand-

stones and in other places
of alluvial or gravel derived
from the alluvial,

As the traveller goes north
the land is more fertile; as
he goes south from the
valley toward the schists
it becomes less and less so
until it is practically barren.

Livermore Valley
Arroyo Mocho

This valley is the next NE from Arroyo del Valle and is separated from it by a high divide. The lower part of it though wider is much like the Arroyo del Valle the rocks being apparently all of the little sandstones. About nine miles from Livermore (the road gradually ascending on or near the crest of the SW. divide) the summit which is of an extremely soft sandstone or sandy soil which gullies badly where the rain runs off, suddenly exhibits the schists which I had previously observed in a side cañon of the del Valle. They are in a much contorted state and above graduate into a shaly rock consisting largely

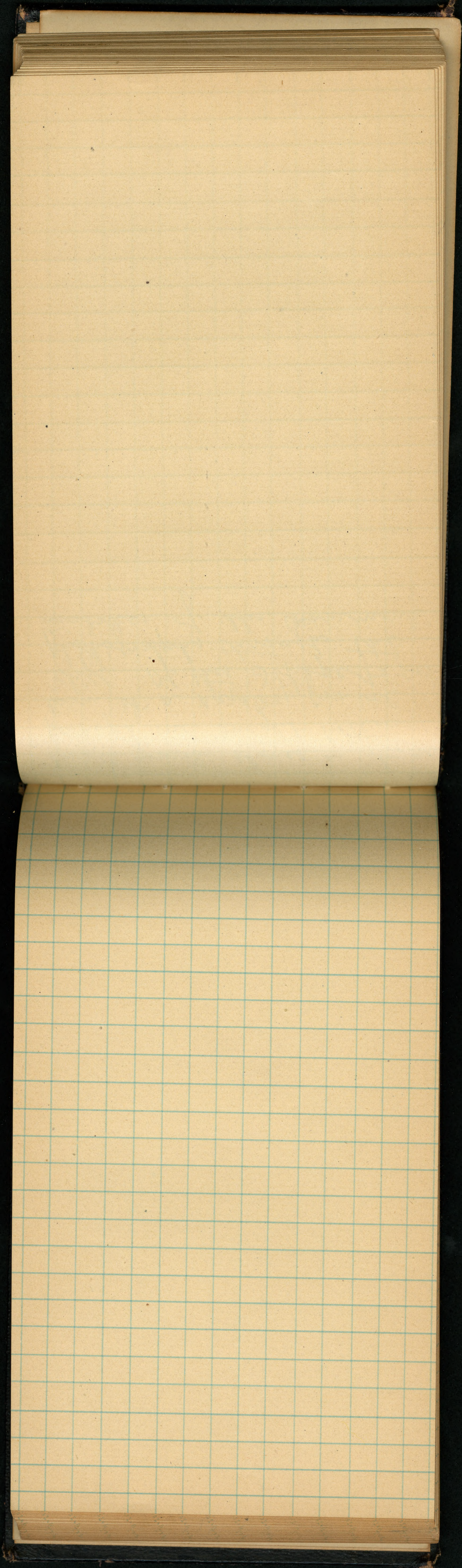
clayey
of iron oxide which has been
mined & ground for paint.
The presence of iron in vary-
ing degrees makes the schists
particolored, and from fissures
in them at about ten miles
from Livermore issue the
mineral springs of Agua
Vida, owned by Mr. Men-
denhall (circular & analyses)
and supposed to be useful for
kidney & rheumatic complaints.
The altitude of the springs is
1750 feet above the sea.

Above the schists the clayey
shales have in places decem-
posed into clay. I observed
no fossils in them.

Dry cañon

This branch of the Arroyo del
Valle extends eastward from the
latter and presents on its NW
side some interesting effects of
erosion by rain upon a very
soft sandy rock with numerous

small gravel stones in it, or
perhaps one might better
term it a sandy gravel
cliff. Of this I hope to get
photographs through the
kindness of Mrs. Hammond.



2 ~~under~~ shirts

2 shirts

2 draws

2 socks

6 hkdps

3 pr cuffs

1 collar

1 - 1/2 cover



